INPUT

PARK 80 PLAZA WEST-I • SADDLEBROOK, NEW JERSEY 07662 • (201) 368-9471

April 17, 1978

Mr. Charles E. White
Executive Editor
Telecommunications
610 Washington Street
Dedham, Mass. 02026

Dear Charles:

The three articles on Value Added Networks are enclosed. If you have any questions, please call me directly, or feel free to contact the authors directly. For your convenience, their addresses are:

Peter Cunningham, President
INPUT
2180 Sand Hill Rd., Suite 320
Menlo Park, California 94025
(415) 854-3422

Robert B. Gamble
Director - Market Planning
ITT Communications Operations Group
67 Broad St.
New York, N.Y. 10004
(212) 797-7454

Graham S. Kemp, Managing Director
INPUT Europe Ltd.
500 Chesham House
150 Regent Street
London, England W1R-5FA
Telephone: London 439-6288

It was a pleasure working with you and if there's anything I can do for you, please do not hesitate to call.

Sincerely,

ELY S. LURIN

ESL:jf

cc: P.A. Cunningham
Robert B. Gamble
Graham S. Kemp

U. S. Telephone
and Telegraph Corporation
A Subsidiary of ITT
67 Broad Street
New York, N. Y. 10004
Telephone (212) 797-3300

APR 26 RECD

April 21, 1978

Mr. Charles E. White
Executive Editor
Telecommunications
610 Washington Street
Dedham, Mass. 02026

Dear Mr. White:

Please note the following correction regarding my company affiliation in the byline for my article entitled "VAN Services in the USA," for the July issue of Telecommunications. The article was forwarded to you along with related articles by Ely Lurin on April 17.

Should read:

Robert B. Gamble
Director - Market Planning
U.S. Telephone and Telegraph Corporation,
a subsidiary of International Telephone
and Telegraph Corporation.

Thank you for noting this correction.

Sincerely,

Robert B. Gamble
Director - Market Planning

cc: Mr. E.S. Lurin

horizon house

610 WASHINGTON STREET
DEDHAM, MASSACHUSETTS 02026

TEL: 617 326 8220
TWX: 710 348 0481
CABLE: MICROSOL

RIGHT TO COPYRIGHT

For valuable consideration received, the receipt of which is hereby acknowledged, and in further consideration of our, HORIZON HOUSE - MICROWAVE, INC., publishing in one of our publications your hereinafter described literary work, you, the author, assign to us, the publisher, all of your right, title, and interest, of every kind throughout the world, in and to a literary work consisting of typewritten page(s) entitled:

"The Future of Value Added Network Services"

NOW PIGE 1 & 2 WERE USED IN INPUT ROOM IN CLIENT

including the right to copyright in our name and renewal thereof.

You also authorize us to use your name and likeness or photograph in connection with the publication and advertising of the work.

You have advised us that you have a right to write this work and to enter into this agreement and that you are the sole owner of the work. You further agree that the work is original, does not violate any copyright or property right, has not been published, has not, nor will it, be submitted to any other publisher for publication.

If you agree with this Agreement, please sign below where noted and return the enclosed copy of this letter.

Very truly yours,

HORIZON HOUSE - MICROWAVE, INC.

By Charles E. White (J.P.)

Charles E. White
Executive Editor

CONSENTED TO
AND AGREED:

Elyse S. Lurin

Peter A. Cunningham

Dated: June 1, 1978

TCS TELECOMMUNICATIONS
610 WASHINGTON STREET, DEDHAM, MASSACHUSETTS 02026
TEL: 617 326 8220 TWX: 710 348 0481

June 1, 1978

Mr. Ely S. Lurin, Principal
INPUT
15 Bond Street
Great Neck, NY 11021

Dear Mr. Lurin:

Prior to publication of your article entitled

"The Future of Value Added Network Services"

which is presently scheduled for the **July 1978** issue of TELECOMMUNICATIONS, we ask that you sign and return to this office the original of the enclosed Publication Agreement.

Sincerely,

Charles E. White
Executive Editor

CEW:emp

Enclosure: Publication Agreement Forms

cc: Mr. Peter A. Cunningham

TCS TELECOMMUNICATIONS
610 WASHINGTON STREET, DEDHAM, MASSACHUSETTS 02026
TEL: 617 326 8220 TWX: 710 348 0481

June 1, 1978

Mr. Ely S. Lurin, Principal
INPUT
15 Bond Street
Great Neck, NY 11021

Dear Mr. Lurin:

Prior to publication of your article entitled

"The Future of Value Added Network Services"

which is presently scheduled for the July 1978 issue of TELECOMMUNICATIONS, we ask that you sign and return to this office the original of the enclosed Publication Agreement.

Sincerely,

Charles E. White
Executive Editor

CEW:emp

Enclosure: Publication Agreement Forms

cc: Mr. Peter A. Cunningham

TCS TELECOMMUNICATIONS
610 WASHINGTON STREET, DEDHAM, MASSACHUSETTS 02026
TEL: 617 326 8220 TWX: 710 348 0481

January 25, 1978

Mr. Eli Lurin
INPUT
15 Bond Street
Great Neck, NY 11021

Dear Eli:

Thank you for accepting the invitation to Peter Cunningham and you to contribute material for our July issue. It is understood that you, personally, will act as coordinator for all the material being assembled and will forward the package to me, to arrive by 14 April.

The package should consist of three manuscripts:

1. An editorial approximately two to three magazine pages in length (7-10 pages of manuscript, double-spaced typewritten), detailing the growth and present status of value-added networks, of message-switching and packet-switching, and the foreseeable future of the latter two.

2. An industry report related to the firms engaged in message switching - identity, location, extent of market for each (if obtainable). This report would involve the same sizes as item 1.

3. A study of the message-switching industry as related to regulatory acts, technical innovations, market progress in the US versus European and Japanese movements. The study can be 3-5 magazine pages in size (10 - 15 pages of manuscript plus 3-6 pertinent illustrations).

Throughout the treatments it would be valuable to remember that 30% of our readership is outside the US. Therefore, treatment of topics should be on an international basis to the extent of your data. I understand that you will be able to obtain some inputs directly from Europe in order to enhance the international flavor of the manuscripts.

A token payment of $250 will be made to the Guest Editor for coordination of items 1, 2, and 3, preparing the Guest Editorial (item 1), and transmitting the package to my office. Other material is paid at the rate of $25/magazine page. All payments are made within 30 days after publication.

If you wish to do so, I'll be happy to review an outline of any of the items above.

Sincerely,

Charles E. White

Charles E. White
Executive Editor

CEW:emp

ESC
1/30/78

Introductory Article

Definition of VAN's

Extent of VAN Services, GROWTH

- Communications Services
- Processing Type of Services
- Spectrum of Services
- Discuss Various Potential Services
  - Data
  - Text
  - Message
  - Image
- Electronic Mail

Attitudes of the users of services

- Growth in Communications
- Growth in Non Voice Services Applicable for VAN's
- Attitudes toward VAN services

Effect on Market Participants

- Carriers
- Computer (Office Equipment Manufacturers)
- Computer Service Companies
- Users

Long Range Scenario

Illustrations

1) Spectrum of VAN services
2) Long Range Scenario, Time Lines

ESC
1/30/78

2 Article on Services and Suppliers in the U. S.

Value Added Services presently being offered, approved by the FCC, submitted to the FCC for approval

Including (but not limited to)

Packet Switching

Fast Circuit Switching

Compatibility

Message & Mailgram

Polling

Companies which provide these services, including (but not limited to) Telenet, Tymnet, SPCC, MCI, Graphnet, ITT, Western Union, A.T.&T

For each vendor discuss as appropriate,

Service offered

special features

Cities covered

Rates

Advantage/disadvantage of service

MARKET SIZE (FROM PUBLIC DOCUMENTS ONLY)

Comparison of cost to transmit the following information using VAN services, Facsimilie, and the DDD Network

A 25 word message

a 3 page of text letter

a 3 page of text and one page illustration letter

a 100 page letter

Illustration

Table of services vs. vendors

ESC
1/30/78

3 Article on International Developments

Europe

Who provides Van Services

What services are being provided

Variations between nations

What services are being tried in experimental systems

Status of Electronic Mail

Rate Structures of Key Services

REGULATION

Japan

What services are being provided, by who

What services are being tried in experimental systems

Status of Electronic Mail

Rate structures of key services

REGULATION

International Record Carriers

Who are they, (ITT, RCA, ATT, WUI, COTC, C & W, Etc.)

What services do they supply

What services are they filing for

Rate structures of key services

REGULATION

Compare Europe vs. U.S., vs. Japan

Status of services

Competitive situation

REGULATION

Cost to send

25 word message

3 page letter (all text)

3 page letter and one page illustration

100 pages of text

What the multinational users do

Expected developments

Illustrations

Status of services, comparison

Transmission cost comparison

ESL

THE FUTURE OF
VALUE ADDED NETWORK SERVICES

BY

PETER A. CUNNINGHAM, PRESIDENT, INPUT

AND

ELY S. LURIN, PRINCIPAL, INPUT

Definition of Value Added Network (VAN) Services

In this article, VAN services are defined as regulated services which do more than merely transmit information. This definition is chosen because it is the intent of the article to examine the total range of services which are wanted by communication users. Thus, legal issues such as who actually owns the communications lines are not examined or included in the definition.

Extent of Use of VAN Services

VAN services are in extensive use, considering the relatively short time they have been in existence. For example, packet switching (supplied by a VAN) is used by over 15% of the Fortune 100/10 (see definitions) companies in the U.S. In 1977, according to the study Value Added Network Services by INPUT, the VAN market for Data/Text/Image VAN services was $50 million growing at 40% a year. This acceptance and growth is particularly significant in that:

- AT&T is not now participating (in a substantive sense) in the market.
- The majority of participating vendors in the VAN market (to date) are relatively small companies.

Even without the participation of AT&T or other large vendors, a strong market for Data/Text VAN services has developed, demonstrating that a basic need exists.

SPECTRUM OF SERVICES

In examining the range of possible VAN services, it is important to note that communications and computing are so entwined that it is often impossible to separate them. The increase in the amount of office automation equipment which is tied to the communications network complicates the problem of defining where communications ends and computing or text processing starts.

To illustrate the relationship between computation and communications, a spectrum of services that extends from pure communications to pure computation is presented in Fig. 1. The extremes of the spectrum are either pure communications services or pure computation services, while the remainder consists of combined computation and communications services. The "combination" services which are regulated are VAN, while the unregulated services are called hybrid services. However, the VAN to hybrid distinction is artificial and does not reflect the user needs.

There is a wide range of possible VAN services, and (just as in computing) many specific offerings which are possible in this range including (also see definitions) the following services:

Data/Text Services:

- Packet switching and fast circuit switching are complementary services. Both fill a different need for the same user.

- Packet switching requires little effort to use and is highly reliable. However, transmission speed is relatively limited, and the service is presently not suitable for voice transmission. Some compatibility functions can be provided.

- Fast circuit switching does not require any computation overhead (once the circuit is set up), permits higher speed data transmission, and is suitable for voice. However, it does not provide any error checking or compatibility functions.

- Store and forward, and polling services help the user organize data flow. Both are suitable for messages as well as Data/Text.

- Compatibility services include services which simply make facsimile, data terminals, or text-editing equipment "look alike" by providing speed, code, and format conversion facilities. More complicated hybrid applications involve changing the structure of the data and implementing sophisticated protocols. A recent survey of over 160 very large communications users showed that compatibility services are the most desired of all VAN services. Communications users look upon compatibility services as a way to allow them to use any type of terminal device in their systems. Since the average Fortune 500 user has over 800 terminal devices (including facsimile) in its network, this flexibility is an important advantage.

Message Services:

- Message services will range from the present services of TWX, TELEX, and MAILGRAM now offered by Western Union to more complex services which offer the ability to transmit and reproduce large volumes of text and graphic information. These will be developed during the next five to ten years.

Voice Services:

- Voice will continue to account for the bulk of communications expenditures during the next 10 years. Voice administration and control is a much desired VAN service because of its potential to reduce communications costs through optimum routing of telephone calls among the direct dial, WATS, and private line services of a company. The ability to bill back communications charges to individual departments is also a desired feature.

Image Services:

- Image services which are just beginning to be offered include facsimile compatibility and image store and forward. The future availability of low cost, wide-band communications facilities will trigger the viability of video conferencing.

Support Services:

- Support services are used to help users design communications systems and keep them operating. These services include maintenance-related support services such as repair, fault

location, automatic diagnosis of what the faults are, network design, and training of operations personnel. They are much in demand by users.

Electronic mail:

- Electronic mail will quickly become important because of the rapid growth of office automation. Over 50% of the Fortune 500/50 companies expect that they will have office automation equipment connected to the communications network by 1982. This will be the driving force for electronic mail. It is important to note that there is no one service called "electronic mail". Existing and potential VAN services will be used in this area, including the data, compatibility and image services discussed above.

  The percentage of documents which contain graphics as well as image information is very high, and the ability to combine text and image information in an efficient manner will be one of the keys to a broad-based, electronic mail service.

Impact on Users and Vendors:

All participants in the information services field will be affected by VAN services:

- Communications companies will be affected by VAN services in the following manner:
  - AT&T will have more opportunities to service subscribers, and to increase the size of each account by performing additional services for the user in the network. AT&T will

also find its basic communications services market will increase as it provides backbone communications to VAN services vendors. But it will also encounter stiff competition from Satellite Business Systems and some of the more specialized carriers.

- The independent carriers will be able to offer AT&T-designed VAN services as an extension to AT&T. However, there will be direct competition to AT&T services from specialized VAN and hybrid vendors. The independents will thus have to decide whether they should enter the VAN market on a nationwide basis to meet this specialized competition.

- The VAN and specialized common carriers have the option of providing unique and specialized services to areas of the market which are too narrow for AT&T.

- Computer services companies will find that there are many new opportunities in the VAN area. Many computer services firms will participate in the market. Industry specialization can extend to the communication of the data as well as to its processing. EFTS is an example of a specialized inter-company communications opportunity.

- Computer and office equipment manufacturers can expect to see a rapid increase in user needs for equipment which operates

in conjunction with VAN services, especially in the electronic mail area. They will also find that new user needs (such as privacy and keeping files of communications) will develop, and that these needs can be met by intelligence built into the communications network, as well as by on-premises equipment. Thus a new form of competition will emerge.

- Users of communications services will find themselves in a situation which is similar to that of the EDP department. That is, the communications system will be comprised of different services supplied by different vendors. These services will have to be made compatible to the needs of the user organization. The users will, therefore, be in a much more sophisticated communications environment. The new communications services will be able to provide greater benefits to the user corporation. However, the risk of making expensive mistakes will also increase.

Long Range Scenario:

- The use of communications will continue its rapid growth, and the Value Added Network services will have a substantial share in this growth.
- Basic developments of the communications field scenario are shown in Figure 2.

  - Present trands toward distributed processing, remote computing, and office automation will continue and drive the market for VAN services.

- The U. S. Postal Service will not improve its service and this will drive companies to electronic communications.

- Sattellite Business Systems (SBS) will be successful in persuading top management of major companies that the use of communications will increase the productivity of their firms. Attention of top management of all firms will then be focused on communications. Thus, rapidly increasing the market potential.

- The VAN vendor firms, especially the fast acting computer service companies, will establish new, acceptable services.

- AT&T, in reaction to SBS, will offer comparable terrestrial or satellite wideband services.

- With both AT&T and SBS providing wideband external communications to establishment premises, wideband internal communications systems will develop. These systems will distribute information throughout the establishment, and will allow information to directly reach the end user. In addition, the large amount of band width (both external and internal) will make video conferencing and high speed facsimile practical.

- The large amount of information processing, display and communications equipment located in user premises will encourage an increased use of VAN services. These services will fill unique niches within either industry or application specialties.

- Extensive communications networks will, in turn, encourage the development of new information processing, storage, and distribution equipment for use in handling data, text, and especially graphics information.

o Additional external events will positively affect the VAN services market in the long term.

- Increasing energy costs will result in the use of information processing to minimize the expense in shipping goods, materials, and personnel.

- The AT&T/IBM/XEROX confrontation in the office environment will be in the area of equipment interconnected to communications. Such equipment will process text, data, and images, as well as the storage and retrieval of this information. This confrontation of major vendors will increase the rate of introduction of equipment into the office.

- The introduction of information/automation into the home and into extremely small enterprises will demonstrate that, with microprocessors decreasing in cost, it will be far easier to produce and deliver information processing equipment than to use it. VAN services vendors can provide the installation of applications for this equipment and interfaces for such services as in-home marketing, and news distribution.

- The U. S. is rapidly becoming an information economy. Thus, all the events in a long range scenario point toward more communications and toward the need for more VAN services.

DEFINITIONS

- Fortune 100/10 Companies - The top 100 manufacturing companies as listed by Fortune Magazine and the top 10 of each of the other Fortune industry sectors.

- Message - A communication mostly in words intended to be read by a person. The quality of the received document does not have to be high.

- Text - Information consisting mostly of words intended to be read by a person. The quality of the document will be high.

- Data - Information consisting mostly of numbers intended for either a machine or a person.

- Information - An encompassing term including text, data and graphic images.

FIGURE I

VAN SERVICES RELATED TO THE

SPECTRUM OF COMMUNICATIONS AND DATA PROCESSING SERVICES

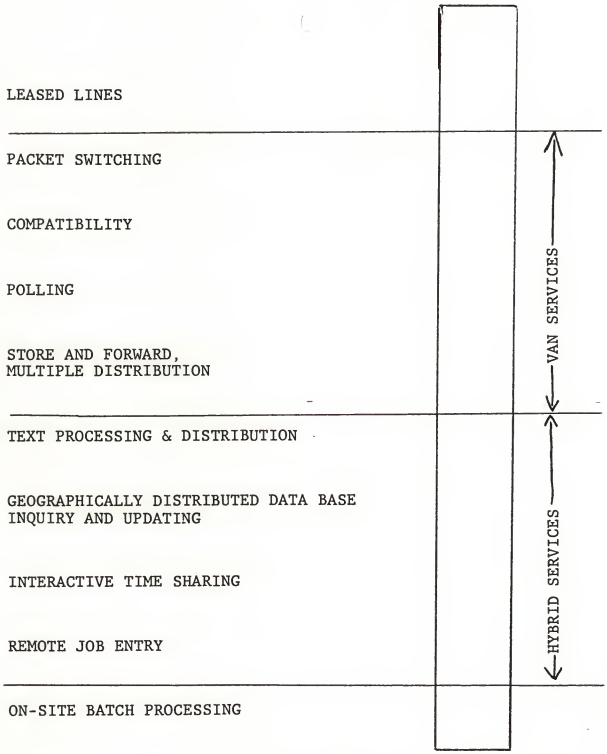
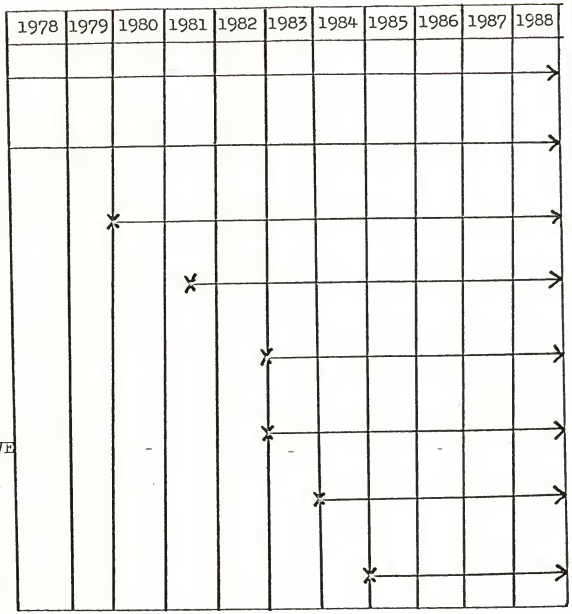


FIGURE 2

SCENARIO: TIME LINES OF MARKET DEVELOPMENT



An Industry Report

VAN Services in the USA

User options are growing, as healthy demand spurs new entrants and offerings.

by: Robert B. Gamble
Director - Market Planning
ITT Telecommunications Services

Prepared for: TELECOMMUNICATIONS, July issue

Instruction to publisher: Any substantive editing of this manuscript must be cleared with the author prior to publication.

Phone contact: (212) 797-7454

April 12, 1978

Article for Telecommunications - July Issue - by R. B. Gamble, COG

An Industry Report - VAN Services in the USA

User options are growing, as healthy demand spurs new entrants and offerings

A series of FCC decisions over the past decade has provided the impetus for a flood of new communications services which is still gathering momentum. Carterfone and the MCI decision in 1968, authority for establishment of Packet Communications, Inc. (PCI) in 1973, the shared use and resale decision in 1976 have all given substance to the FCC's campaign to stimulate innovation through competition in communications services.

In the area of data communications, the PCI decision in 1973 led to the creation of a new class of carriers - the Value Added Networks or VAN's. For purposes of this report, the technically similar offerings of the traditional common carriers will also be treated as VAN services.

In the voice area, the Other Common Carriers (OCC's) and AT&T have been introducing new private line and network services which increase the flexibility and utilization of transmission facilities and provide other user benefits. These new voice services will also be treated as "VAN services". Communications-related plans of computer service vendors, the U.S. Postal Service and others (such as electronic mail and electronic funds transfer systems) could be considered in a still broader concept of "value added services", but are beyond the scope of this report.

The roster of VAN's has grown - Telenet, Tymnet, Graphnet, MCI, SPC, ITT. AT&T has responded with new offerings of its own - Enhanced Private Switched Communications Service (EPSCS), Transaction Network Service (TNS) and the highly publicized yet unannounced (as of this writing) Advanced Communications System (ACS).

Users initially proceeded with caution in checking out the quality and reliability of new VAN services, but are now moving more boldly to extend their usage. Tymnet's revenues grew 80% in 1977 to a figure in excess of $10 million, and this growth rate is reportedly being maintained in 1978. Telenet pegs its current growth rate at 8%/month.

Industry studies project dramatic growth in the variety and usage of VAN services during the next decade - reaching billion dollar proportions during the 1980's.

In order to provide an overview of the value-added services currently operating or shortly to become available to users in the U.S.A., we shall examine briefly the carriers and then their offerings.

The VAN Carriers

Tymnet, Inc. is wholly owned by Tymshare, Inc., a major independent computer services vendor with 1977 revenues of $101 million. Tymnet was created as a private network in 1971 by Tymshare, Inc. to supply its needs for communications services. It has progressed by stages from a private network to shared-user network to the present common carrier status and today has the largest revenue base of the data oriented VAN's. It is reported to be operating profitably.

Telenet Communications Corporation (Telenet) was created by Bolt Beranek and Newman, Inc. (BBN) which remains its largest shareholder. BBN is the systems house which created ARPANET - the first major packet switching network - just 10 years ago. Telenet was formed early in 1973 and went public in December of 1977 with a

$8.3 million public stock offering. It has extended its network and services since becoming operational in 1975 and is presently installing third generation packet switching equipment throughout its network to further increase its flexibility and capacity for handling data and message traffic.

International Telephone & Telegraph Corporation (ITT), long an international and overseas voice and record carrier, entered the U.S. domestic market with its Hartford-to-Houston United States Transmission Systems, Inc. (USTS) high quality terrestrial microwave network in 1976. ITT Corporate Communications Services, Inc. (ITT-CCS) is introducing two voice-VAN services this year: Switched Private Network Service (SPNS) and Corporate Communications Switching Equipment (CCSE). A second major ITT VAN project is the COM-PAK packet-switched network of ITT Domestic Transmission Systems, Inc., which will start its nationwide facsimile service (FAX-PAK) in 1979.

MCI Telecommunications Corporation (MCI) was established in 1968 as a Specialized Common Carrier (SCC). The company achieved profitability in 1976 with annual revenue of $60 million. Today over 40% of MCI revenues are in VAN services, mainly EXECUNET voice service. MCI also provides Shared Private Line Service (SPLS) and Computer Controlled Switching Arrangement (CCSA) services.

Southern Pacific Communications Company (SPC) is a nationwide specialized common carrier wholly owned by the Southern Pacific Company. Its networking experience is based on the extensive private microwave experience of its railroad parent, the Southern Pacific Company, and from SPC's acquisition of other microwave carriers (most recently Datran) since its establishment in 1970. SPC offers both voice and facsimile VAN services. Its SPRINT (Switched Private Network) services were initiated in 1976. A further extension of this service (SPRINT V) is before the FCC. SPEEDFAX, SPC's facsimile offering, was introduced in 1977.

Graphnet Systems, Inc. (GRAPHNET) is wholly owned by Graphic Scanning Corporation, a designer and provider of specialized communications systems. The parent, Graphic Scanning, went public with a $10 million minority interest offering in April, 1977. Graphnet presently offers store-and-forward facsimile and terminal-to-terminal data services. It has under construction a packet-switched data network which it states will be operational later this year.

American Telephone & Telegraph Company (AT&T) offers TNS (Transaction Network Service), an alternatively polled or dial access interactive data service, in three states (Washington, Minnesota,

Colorado) and will expand this "value-added" service to additional states based on demand. Bell has recently introduced a CCSA-like offering designated Enhanced Private Switched Communications Service (EPSCS) - and announced its intentions to tariff a packet-switched data service later this year under the designation of Advanced Communications System (ACS).

Western Union Telegraph Company (WU) is the USA's major provider of record services (Telex/TWX/telegram). WU initiated Mailgram service jointly with the U.S. Postal Service in 1970. Enhancements of this VAN-like service include Stored Mailgram and Business Reply Mailgram. WU's InfoCom service introduced in the early 1970's is a private message network system with store-and-forward and shared private line features. Western Union also provides VAN-like services for the U.S. Government in Autodin II, which is a packet-switched data network.

VAN Services

Three categories of VAN services will be discussed: Terminal-to-computer services, facsimile and other message services, and voice/data VAN services.

Terminal-to-Computer Services. The packetized offerings of Telenet and Tymnet are the only public VAN services of this type available nationally today. AT&T's Transaction Network Service (TNS) also fits this category, but is only available on an intrastate basis in three states presently and is being rolled out slowly. AT&T, ITT and Graphnet each have terminal-to-computer networks employing packet-switching technology in various stages of development.

Essentially these networks meet user needs for:

Higher reliability - through redundant circuitry, alternate routing and sophisticated error correction techniques.

Compatibility - for interfacing a wide variety of terminals and host computers.

Economy - frequently by an order of magnitude, by efficient utilization of transmission media and distance-insensitive pricing.

Flexibility - in choice of terminals, in adding new locations and applications and handling growth in traffic.

Cost-effective business applications for packet communications include:

Remote computing services

Data base access and information services

Order entry and inventory management services

Credit checking and other financial transactions

Travel reservations

Electronic mail services.

The principal tradeoffs among present VAN and telco data services relate to access costs/cities directly served and data speeds and protocols which can be accommodated. An example of pricing tradeoffs between packet services and long distance telephone rates is provided by the following chart.

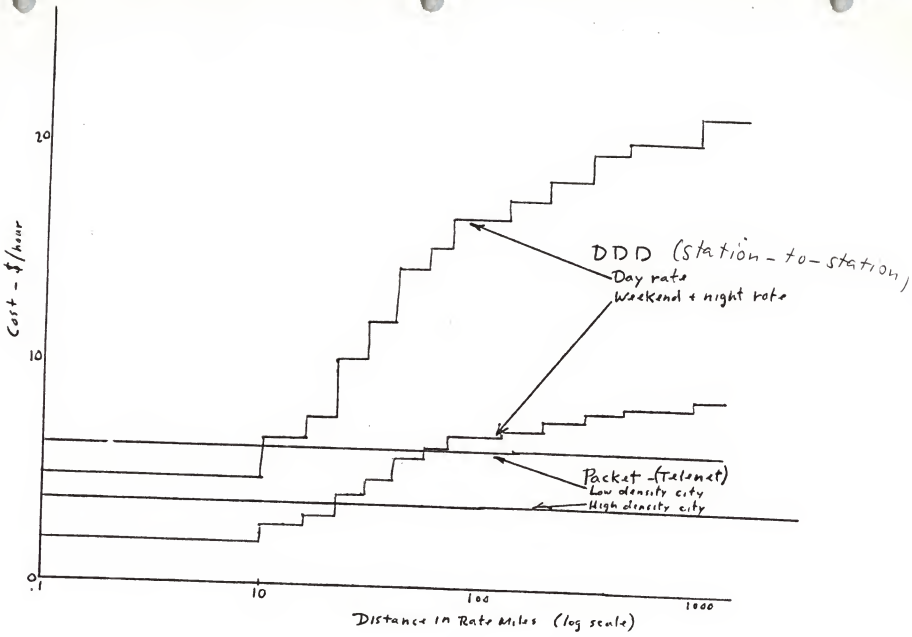


Figure 1. DDD/Packet Rate Comparison

It can be seen that on a purely variable cost basis packet switching is cost-effective from Telenet high density cities for any distance, and costs about one-fifth of station-to-station long distance at a communicating distance of 1000 miles.

Facsimile and Other Message Services. In the decade prior to emergence of the VAN's, Western Union was virtually the sole provider of message services in the USA under monopoly protection of the U.S. government. New technology and government policy are gradually opening the $600 million message market to competition with new facsimile systems paving the way. There are now three publicly announced carrier facsimile services, each quite different in structure and market served. They are described below in the order of appearance in the marketplace.

GRAPHNET began offering fax services in January, 1975. It offers both terminal-to-fax service and terminal-to-bureau service with local messenger or telephone delivery and optional mail confirmation. The latter services are marketed under the FAXGRAM trademark. The network provides compatibility of TELEX/TWX and various data terminals as input devices with facsimile output. It supports several 4-5 minute fax models as delivery terminals. GRAPHNET offers two or three delivery priorities depending on the service used. FAXGRAM services compete most directly with Western Union TELEGRAM services and offer savings of up to 50% depending on the city pairs involved.

A real time SPEEDFAX service was introduced by SPC in 1977 as either a transmission service only or as a transmission and terminal package. Local dial-up access is provided in 24 cities (as of April 1) with six more cities scheduled by year-end. SPEEDFAX transmission rates are currently $.25/minute for any distance. Terminal compatibility is limited to that inherent in the fax machines employed. A store-and-forward SPEEDFAX service is also provided, which offers some machine-to-machine compatibility and five delivery options: 1/2 hour, 2 hours, overnight, mail out and hold for pickup.

ITT's FAX-PAK facsimile offering becomes operational next year and provides universal compatibility among 2, 4, 6 minute and sub-minute fax machines including the newer Japanese models. Compatibility is also provided with TELEX/TWX and various data terminals used as input devices. A high degree of economy and reliability are provided by packet switching, data compression, and routing redundancy in this na onal network. Three delivery options are offered: immediate (within 15 minutes), four hours, and overnight. Other features offered are multiple addressing, acknowledgment of receipt, and directory services. Pricing is usage sensitive and distance insensitive and is expected to make feasible a variety of new electronic mail applications for large and small business users.

MAILGRAM was created in 1970 as a joint service of Western Union and the U.S. Postal Service. It provides the user substantial economies vs. TELEGRAM service while retaining much of the attention-getting qualities of a TELEGRAM. A full range of input options is available for MAILGRAM, including TELEX/TWX, phone-in and hand carry to the nearest WU office. Messages are carried via WU circuits to any of 140 serving U.S. Post Offices for next day delivery via the Postal Service. Business reply, stored address list and stored text options provide the user with additional flexibility. MAILGRAM is now a $50 million business for Western Union and growing in excess of 20% per year. It appears that 1978 will be the cross-over year - in which MAILGRAM revenues surpass those of Western Union TELEGRAM services for the first time.

Perhaps the most significant group of new public message services ultimately will be the new computer-based message systems. Three such offerings have been approved by the FCC; Tymnet's OnTyme service is tariffed and presently becoming available. ITT's terminal-to-terminal service and Telenet's TELEMAIL service are not yet available. These services will offer many computer-based flexibilities. Features of OnTyme as outlined in Table 1 are representative. Present service rates for OnTyme message service include:

Monthly service charge	$1.00
Usage charges (distance insensitive)	$.04/minute for 110-300 baud access at high density locations $.25/minute via in-WATS

A typical 500 character message entered via a 300 bps terminal in a high density city and delivered at 300 bps in a low density city would have a message cost of $.32.

TABLE 1

SUMMARY OF ON-LINE FUNCTIONS

- Verifies authorized use at log in.
- Allows user inquiry of message status.
- Provides optional on line message preparation and editing.
- Adds time and data to all messages.
- Assigns unique master message number.
- Holds or dials out for delivery at user's option.
- Assigns output sequence number at time of delivery.
- Delivers to group coded destinations.
- Responds with error messages to users as appropriate.
- Provides on line file storage for frequently used messages or data.
- Holds all messages three days for on-line retrieval.
- Saves archive messages on tape for 90 days.
- Provides traffic analysis data for management control.

Voice/Data VAN Services. The two major classes of voice/data VAN services are shared private line services and common control switching arrangements.

The former, represented by MCI's EXECUNET, SPLS and Quickline services, SPC's SPRINT services and ITT's SPNS service provide means

for the small to medium-sized user with multiple interstate locations to benefit from the economies of shared private line usage. These offerings thus fill a significant gap between telco DDD, WATS and private line offerings. VAN rates for a daytime NY to LA call are roughly half the cost of a station-to-station DDD call. Table 2 distinguishes the offerings of the three carriers. These VAN services may be used alternatively for voice or data.

Table 2 - Comparison of Switched Private Line Offerings

Service Description	MCI	SPC[1]	ITT
1. Measured usage point-to-point voice or data (a hotline-like service)	Quickline	SPRINT I	SPNS
2. Foreign exchange service (FX)	SPLS	SPRINT II	SPNS
3. Measured usage, switched service . Dedicated access line one end . Service between designed city pairs . On-net to off-net capability	SPLS	SPRINT III	SPNS[2]
4. Measured usage, switched service with off-net to off-net capability	EXECUNET (will take new customers up to capacity of present facilities. Further legal and regulatory actions pending.	SPRINT V (Tariff not yet aporoved by FCC)	
Tariff Rates			
5. Access Line	$45	$32	$30
6. Port charges	$50	$65	-
7. Usage charges per minute (plus $.0016/100 miles in all cases)	$.1200	$.1125	$.1563
8. Minimum monthly usage charge	$250/originating end	-	$150/port

Notes

1. SPRINT IV not approved by FCC. Offering withdrawn and replaced by SPRINT V
2. SPNS similar to the others except no off-net calling provided

Common Control Switching Arrangement service (CCSA) was first offered by AT&T in the 1960's in response to demand of very large users for uniform numbering, automatic alternate routing and other features. MCI introduced its CCSA offering in September of 1976, directed at a broader range of users having a mixture of leased, FX and WATS lines as well as DDD - applications where trunk status reporting and least-cost routing can measurably improve service and substantially reduce cost. Early this year, AT&T cut over its first customer on a new service - Enhanced Private Switched Communications Service (EPSCS). EPSCS offers all ESS, 4-wire switching features and customer network control center on customer premises. The new service requires a customer to order and maintain a system minimum of 700 terminals (~~switching~~ ports) and 125 terminals at each switch.

In June, 1977, ITT was the first to tariff a modernized CCSA service - its Corporate Communications Switching Equipment service (CCSE). The ITT offering is highly competitive for companies that do not meet the minimum port requirements of EPSCS. Relative competitiveness for the largest systems will depend on location of specific user facilities relative to network switches. Switching features of CCSE (features common also to SPNS) are comparable to EPSCS with some pluses and minueses on both sides.

Table 3

Switching Features of ITT's CCSE and SPNS

4 wire switching

Uniform 7 -digit numbering plan

Abbreviated dialing

Alternate routing

Adaptive routing

Hot line

Conference calling

Customer management center

Call record logging

CCSE and EPSCS each begin life with seven switching cities - four in common: New York, Chicago, Los Angeles and Dallas. CCSE adds Atlanta, Memphis and Cleveland. EPSCS adds Rochester, White Plains, N.Y., and Arlington, Va.

SERVICE	CARRIER	YEAR SERVICE INITIATED	NO. OF CITIES SERVED DIRECTLY AS OF MID-1978	SERVICE OFFERED INTERNATIONALLY
I. Data Services				
A. Packet Switched and other Interactive Data Services				
TYMNET	TYMNET	1972	135	X
TELENET	TELENET	1975	81	X
COM-PAK	ITT-DTS	Future	-	-
GRAPHNET	GRAPHNET	Future	-	-
ACS	AT&T	Future	-	-
TNS	AT&T	1977	3 states	-
B. Facsimile and other Message Services				
GRAPHNET	GRAPHNET	1975	46	X
SPEEDFAX	SPC	1977	24	-
FAX-PAK	ITT-DTS	1979	-	-
MAILGRAM	Western) Union)	1970	140 *	-
FAXGRAM	GRAPHNET	1975	-	-
ON-TYME	TYMNET	1977	-	-
TELEMAIL	TELENET	Future	-	-
COM-PAK	ITT-DTS	Future	-	-

* Accesses all cities in USA from 140 serving postal stations

SERVICE	CARRIER	YEAR SERVICE INITATED	NO. OF CITIES SERVED DIRECTLY AS OF MID-1978	SERVICE OFFERED INTERNATIONALLY
II. Voice/Data/Services				
A. Switched Private Line Services				
QUICKLINE	MCI	1974	18	-
EXECUNET	MCI	1975	18	-
SPLS	MCI	1975	18	-
SPRINT I, II, II	SPC	1976	20	-
SPRINT V	SPC	-	-	-
SPNS	ITT-CCS	1978	16	-
B. CCSA Services				
CCSE	ITT-CCS	1978	7 **	-
CCSA	MCI	1976	6 **	-
EPSCS	AT&T	1978	7 **	-

** Switch locations

ESL

VALUE ADDED NETWORK SERVICES

IN EUROPE

BY

GRAHAM S. KEMP

MANAGING DIRECTOR, INPUT EUROPE LTD.

NO VANS ALLOWED HERE .....

Talk of Value-Added Network Services in Europe raises the hackles of the European PTT's who instantly associate the idea with independent networks that operate "cream-skimming" services in competition to the standard carriers. In Europe the PTTs have a monopoly (by consent or decree) of the public telecommunications which they have no intention of relinquishing. The general reaction to the idea of allowing VAN services to be run by anyone but themselves is therefore anathema to them.

Two factors mitigate this uncompromising stand however, which deal with the definition of exactly what VAN is, on the one hand, and the extent to which the PTTs can agree to a common policiy.

.....EXCEPT IN THIS CASE....

Notwithstanding this "a priori" reluctance of the PTTs, several have gone ahead implementing links (themselves, and even allowing others to do so for them) tying the U.S. Networks into the European public switched networks, which in turn can be tied into the packet switched networks now being implemented in most European countries.

In the United Kingdom TYMSHARE has leased to the Post Office the telecommunications switching equipment and facilities necessary to tie the Telenet and Tymnet services into the UK switched network. The transatlantic link is provided by Western Union International. Thus any database linked to (or service provided by) the Telenet and Tymnet networks are accessible through this link.

TYMNET/TELENET LINK CHARGES (UK Charges)	
• Data	$ 0.57 per thousand characters transmitted or received
• Duration	$12.54 per hour per terminal
• Subscription charge	$ 9.50 per user same per quarter'
• Database charge	- depends on database used

Demand is high : in the first three months of operation the access to transatlantic databases from the UK exceeded the forecast for the entire initial 12 month period.

....AND THIS....

In the same way, the Dutch PTT has installed a Tymnet CP-2 concentrator (based on a Varian V72 mini) and the French and Belgians offer the same service (the French through ITT World Telecommunications) with the Swiss, Spanish and German similarly engaged in setting up equivalent services).

But the shape of things to come was hinted at with the recent experimental hook-up of Canada's Datapac packet switched network to the French Transpac service. Links of this nature are the PANDORA'S box for access by users to the VAN services in North America.

....AND HOW DO YOU STOP THIS ?

The possibilities have yet to be explored by users, since the packet switched networks in Europe are only just coming into service, but once each country's packet switched network comes into operation, with links between them and the US and Canada established, how can the PTTs control the usage, by a subscriber, of the innumerable computers and databases that will be on-line, each with its own applications and product/service offering ? The answer is simple. They can't. In the same way, today, the use of the "mailbox" feature of a timesharing network can be construed as text/data message transmission by a private network and has been declared "illegal" by the UK Post Office. This hasn't stopped its (discreet) usage.

EURONET will tie the EEC together

Euronet, a projected pan-European X-25 protocol network has started life as a private network linking databases held in the EEC (e.g. the German Institute of Medical Documentation and Information database, held on a Siemens 4004 ; the European space Agency Space Documentation Service centre running on an IBM 360/50 in Frascati Italy etc). Nine common market countries have agreed to go live with Euronet by 1980. The packet

switching nodes will be in Paris, London, Frankfurt and Rome with access centres in Amsterdam, Brussels, Copenhagen, Dublin and Luxembourg.

Euronet costs are not negligeable but have the merit of being distance independent.

EURONET CHARGES

CIRCUIT TYPE	Annual Rental ($)		DURATION COST PER HOUR ($)		
	From 300 bps	to 48Kbps	1200 bps	9600bps	48Kbps
PSN	38		2.57	N/A	N/A
Leased	570	5700	1.9	2.57	6.84

+ $2.19/thousand 64 byte segments

The network will provide European packet switching facilities to those countries who do not plan to have extended domestic coverage. In Italy, for example, the PTT will provide its own packet switched network as an extension of EURONET. In many instances the international connection will be available before the domestic networks are ready.

EUROPEAN PACKET SWITCHED NETWORKS STANDARDIZE ON PROTOCOL

Despite the experimental lauch of several non-standard line and message protocols, one by one all of the European PS networks have adopted X-25 as the standard interface. In reality there are a set of interface and procedure standards :

- X-3 defines the packet assembly/disassembly (PAD)
- X-28 defines the interface between the network and start/stop terminals
- X-29 defines the procedure between terminals and the PAD hardware.

PRIVATE INTERNATIONAL NETWORKS

There is no restriction, of course, on the use made of private networks within the company that owns them. There are many such networks, (e.g. Unilever, Philips, IBM etc) where subsidiary companies of a group are tied

into each other for intra company communications.

Special purpose networks with a clearly defined function (e.g. the SWIFT banking network) are also allowed. Basically the PTTs of Europe want to retain "account control" or the marketing interface with the public for the communications requirements, broadly defined. Neither digital networks (now going in for the main trunk connections) nor satellite communications will change this attitude. Both will come under the same control and restrictions, as the present analogue land lines communications.

SATELLITE COMMUNICATIONS - ARE THEY NECESSARY ?

Many problems face the implementation of satellite communications most of which have nothing to do with the PTTs, but relate to the geography of Europe. In contrast to the (relatively) wide open spaces separating the large conurbations of the U.S., Europe is a densely-populated, crowded environment which poses the following problems :

- In Europe, 30 or so sovereign countries share the spread of frequencies available (rather than two in North America)
- There are many existing microwave transmissions that would interfere with the earth/satellite/earth communications. Earth stations have therefore to be placed in remote locations.
- The long distances that make satcoms worthwhile in the U.S. do not occur in Western Europe. The economics of the situation are therefore very different.

At present earthbound link rates, and projected costs for satcoms, the break-even distance is 800 kilometres. In many countries this eliminates the economy factor in the decision process. Reliability has also to be taken into account at present, with the innumerable back-up ground links available on most connections offering strong advantages over satcoms. The same arguements apply to the use of satcoms for TV transmissions.

ELECTRONIC MAIL - GERMANY's EXAMPLE

European developments in this sector are merely embryonic but several significant efforts have been made by individual PTTs to establish the groundwork for the practical implementation of networks serving this requirement. These studies have examined the type of input suitable for such systems in terms of content, frequency and variety of the data forms that can be classified as "mail" (short messages, personal and business letters etc).

The most complete and thorough is that of the West German Bundesministerium für das Post-und Fernmeldewesen, which has dimensioned the volumes of "mail" by type of source and receiver and the network speed necessary to accomodate it.

SOURCE	%	Electronic Mail	%	Receiver
• BUSINESSES	79	40% / 39%	48	BUSINESSES
• PRIVATE INDIVIDUALS	21	8% / 13%	52%	PRIVATE INDIVIDUALS
Total Volume: 5 billion messages/yr or 20 million per day				

Source : Bundesministerium f. Post-/Fernmeldewesen

Ordinary mail volume is 36 million letters per day currently, of which nearly 45% would be unsuitable for transmission on an Electronic Mail network. Around 15.8 million of the remainder come from business sources, of which an estimated 8 million can be accomodated on an economically viable basis by an electronic mail service, and would be handled best by remote copiers (33%) and remote typewriters (67%). Estimating each transmission as an average of 1.5 A4 pages, (8¼ x 11 3/4) provides the number of stations needed in the network, counting an average traffic of 10 message per unit=

- 400,000 remote typewriters
- 200,000 remote copiers

NETWORK IS PRACTICAL

The resultant network transmission volumes can be handled by today's technology, albeit with a substantial though not exhorbitant investment. The remote typewriter stations business sites would transmit input at 300 bits/sec. (1 page per minute) and the telecopiers (which transmit images and require 200,000 bits/page if redundency reduced) at 2400 bits/sec. (1 page every 1.4 minutes). The public "electronic mailbox" (also at 200,00 bits/page) would need to transmit at 64,000 bits/sec. Each concentrator centre would be composed of a store and forward capability, communicating with other centres at 4800 bits (1 page every 33 seconds) and the process is reversed at the other end.

User costs per type of machine depend on the number of them taking part but in the above hypothesis the total investment would be of the order of $1.2 billion and a single letter cost of 8¢, already cost effective and competitive with conventional systems. There is little incentive to go ahead with such plans, however, since the PTTs will be faced with an enormous reconversion problem of staff, facilities and equipment. Electronic mail must surely, therefore, move forward slowly in stages cohabiting with traditional manual methods for a long time to come.

VANS In Europe

GRAHAM S. KEMP
Managing Director, Input Europe Ltd.

Talk of Value-Added Network Services in Europe raises the hackles of the European PTTs who instantly associate the idea with independent networks that operate "cream-skimming" services in competition to the standard carriers. In Europe the PTTs have a monopoly (by consent or decree) of the public telecommunications which they have no intention of relinquishing. The general reaction to the idea of allowing VAN Services to be run by anyone but themselves is therefore anathema to them.

Two factors mitigate this uncompromising stand however; one, what exactly is a VAN, and two, to what extent can the PTTs agree to a common policy.

Notwithstanding this "a priori" reluctance of the PTTs, several have gone ahead implementing links (themselves, and even allowing others to do so for them) tying the US networks into the European public switched networks, which in turn can be tied into the packet switched networks now being implemented in most European countries.

In the United Kingdom TYMSHARE has leased to the Post Office the telecommunications switching equipment and facilities necessary to tie the Telenet and Tymnet services into the UK switched network. The transatlantic link is provided by Western Union International. Thus any data base linked to (or service provided by) the Telenet and Tymnet networks are accessible through this link (Table 1).

Demand is high: in the first three months of operation the access to transatlantic data bases from the UK exceeded the forecast for the entire initial 12-month period.

In the same way, the Dutch PTT has installed a Tymnet CP-2 concentrator (based on a Varian V72 mini) and the French and Belgians offer the same service (the French through ITT World Telecommunications) with the Swiss, Spanish and Germans similarly engaged in setting up equivalent services.

But the shape of things to come was hinted at with the recent experimental hook-up of Canada's Datapac packet switched network to the French Transpac service. Links of this nature are the Pandora's box for access by users to the VAN Services in North America.

UNEXPLORED FRONTIERS

The possibilities have yet to be explored by users, since the packet switched networks in Europe are only just coming into service, but once each country's packet switched network comes into operation, with links between them and the US and Canada established, how can the PTTs control the usage, by a subscriber, of the innumerable computers and data bases that will be on-line, each with its own applications and product/service offering? The answer is simple. They can't. In the same way, today, the use of the "mailbox" feature of a timesharing network can be construed as text/data message transmission by a private network and has been declared "illegal" by the UK Post Office. This hasn't stopped its (discreet) usage.

Euronet Will Tie the EEC Together

Euronet, a projected pan-European X-25 protocol network has started life as a private network linking data bases held in the

TABLE 1
TYMNET/TELENET LINK CHARGES
(UK Charges)

Data	$ 0.57 per thousand characters transmitted or received
Duration	$12.54 per hour per terminal
Subscription charge	$ 9.50 per user same per quarter
Data base charge	– depends on data base used

EEC (e.g., the German Institute of Medical Documentation and Information data base, held on a Siemens 4004; the European Space Agency Space Documentation Service Centre running on an IBM 360/50 in Frascati Italy, etc.). Nine common market countries have agreed to go live with Euronet by 1980. The packet switching nodes will be in Paris, London, Frankfurt and Rome with access centres in Amsterdam, Brussels, Copenhagen, Dublin and Luxembourg.

Euronet costs are not negligible but have the merit of being distance independent (Table 2).

The network will provide European packet switching facilities to those countries who do not plan to have extended domestic coverage. In Italy, for example, the PTT will provide its own packet switched network as an extension of Euronet. In many instances the international connection will be available before the domestic networks are ready.

Despite the experimental launch of several non-standard line and message protocols, one-by-one, all of the European PS networks have adopted X-25 as the standard interface. In reality there are a set of interface and procedure standards:

- X-3 defines the packet assembly/disassembly (PAD)
- X-28 defines the interface between the network and start/stop terminals
- X-29 defines the procedure between terminals and the PAD hardware.

PRIVATE INTERNATIONAL NETWORKS

There is no restriction, of course, on the use made of private networks within the company that owns them. There are many such networks, (e.g., Unilever, Philips, IBM, etc.) where subsidiary companies of a group are tied into each other for intra-company communications.

Special purpose networks with a clearly defined function (e.g., the SWIFT banking network) are also allowed. Basically the PTTs of Europe want to retain "account control" or the marketing interface with the public for the communications requirements, broadly defined. Neither digital networks (now going in for the main trunk connections) nor satellite communications will change this attitude. Both will come under the same control and restrictions, as the present analogue land lines communications.

SATELLITE COMMUNICATIONS — ARE THEY NECESSARY?

Many problems face the implementation of satellite communications most of which have nothing to do with the PTTs, but relate to the geography of Europe. In contrast to the (relatively) wide open spaces separating the large conurbations of the US, Europe is a densely populated, crowded environment which poses the following problems:

- In Europe, 30 or so sovereign countries share the spread of frequencies available (rather than two in North America)
- There are many existing microwave transmissions that would interfere with the earth/satellite/earth communications. Earth stations therefore have to be placed in remote locations
- The long distances that make satcoms worthwhile in the US do not occur in Western Europe. The economics of the situation are therefore very different.

At present earthbound link rates, and projected costs for satcoms, the break-even distance is 800 kilometres. In many countries this eliminates the economy factor in the decision process. Reliability has also to be taken into account at present, with the innumerable back-up ground links available on most connections offering strong advantages over satcoms. The same arguments apply to the use of satcoms for TV transmissions.

European developments in this sector are merely embryonic but several significant efforts have been made by individual PTTs to establish the groundwork for the practical implementation of networks serving this requirement. These studies have examined the type of input suitable for such systems in terms of content, frequency and variety of the data forms that can be classified as "mail" (short messages, personal and business letters, etc.).

The most complete and thorough study is that of the West German Bundesministerium fur das Post-und Fernmeldewesen, which has dimensioned the volumes of "mail" by type of source and receiver and the network speed necessary to accommodate it (Table 3).

TABLE 2
EURONET CHARGES

CIRCUIT TYPE	Annual Rental (A)		DURATION COST PER HOUR (B)		
	From 300 bps	to 48kbps	1200 bps	9600 bps	48kbps
PSN	38		2.57	N/A	N/A
Leased	570	5700	1.9	2.57	6.84

+ $2.19/thousand 64 byte segments

TABLE 3

SOURCE	%	Electronic Mail	%	RECEIVER
BUSINESSES	79	40%	48	BUSINESSES
PRIVATE INDIVIDUALS	21	39% 5% 13%	52	PRIVATE INDIVIDUALS

Total Volume: 5 billion messages/yr or 20 million per day

Source: Bundesministerium f. Post-/Fermeldewesen

62 ▶

Ordinary mail volume is 36 million letters per day currently, of which nearly 45 percent would be unsuitable for transmission on an electronic mail network. Around 15.8 million of the remainder comes from business sources, of which an estimated eight million can be economically accommodated by an electronic mail service, and would be handled best by remote copiers (33%) and remote typewriters (67%). Estimating each transmission as an average of 1.5 A4 pages (8¼ x 11¾), provides the number of stations needed in the network, counting an average traffic of 10 message per unit equal to 400,000 remote typewriters, and 200,000 remote copiers.

NETWORK IS PRACTICAL

The resultant network transmission volumes can be handled by today's technology, albeit with a substantial though not exhorbitant investment. The remote typewriter stations business sites would transmit input at 300 bps (1 page per minute) and the telecopiers (which transmit images and require 200,000 bits/page if redundancey is reduced) at 2400 bps (1 page every 1.4 minutes). The public "electronic mailbox" (also at 200,000 bits/page) would need to transmit at 64,000 bps. Each concentrator centre would be composed of a store and forward capability, communicating with other centres at 4800 bits (1 page every 33 seconds) and the process is reversed at the other end.

User costs per type of machine depend on the number of them taking part but in the above hypothesis the total investment would be of the order of $1.2 billion and a single letter cost of eight cents, already cost effective and competitive with conventional systems. There is little incentive to go ahead with such plans, however, since the PTTs will be faced with an enormous reconversion problem of staff, facilities and equipment. Electronic mail must surely, therefore, move forward slowly in stages co-habiting with traditional manual methods for a long time to come.

OVER 100 200 300 'INTELLIGENT' NODES

IN TYMNET'S PACKET NETWORK SERVICE

Take a close look at TYMNET quality, and you'll understand why it's the No. 1 packet network service. For example, our network incorporates more than 300 "intelligent" nodes in locations strategically situated throughout the U. S. These nodes are fully programmable, powerful computers dedicated to communications processing, not simply multiplexors.

With this quantity of intelligence built into TYMNET, our users in virtually all major U. S. locations can actually realize the value-added benefits of packet technology. Other packet networks, which most often are predominately multiplexor networks, can only offer these benefits in a few selected locations.

What are the benefits of TYMNET'S true packet network quality?

- Highly sophisticated error detection and correction
- Alternate routing if a direct transmission facility should go down
- Full compatibility with all standard terminals and transmission codes.
- "Turnkey" network management for the user
- Significant cost advantages

The number of intelligent nodes is only one of the key ways in which TYMNET differs qualitatively from other packet network services. There's also the confidence and security that comes from dealing with a packet network carrier with over five years of intensive operating experience. And the flexibility of a programmable interface to your computer. And coverage to over 130 U. S. cities. And international connections.

TYMNET has been specifically designed to meet the unique operating requirements of geographically dispersed low speed (1200 bps and below) terminals. Typical applications include time sharing, database access, and message switching.

If you're a computer network manager, you owe it to yourself to investigate the many operating and economic advantages of TYMNET, the packet network service acknowledged as number one. For more information on TYMNET and how it can assist with your data communications needs, contact your regional TYMNET office or write or call Tymnet, Inc., 10261 Bubb Road, Cupertino, CA 95014, (408)446-7031.

No. 1 in packet network service for a lot of good reasons

TYMNET®

Eastern Region (301) 770-5710 *Central Region (713) 780-4455* *Western Region (408) 446-7031*

Circle 38 on Reader Service Card

VANS In Europe

GRAHAM S. KEMP
Managing Director, Input Europe Ltd.

Talk of Value-Added Network Services in Europe raises the hackles of the European PTTs who instantly associate the idea with independent networks that operate "cream-skimming" services in competition to the standard carriers. In Europe the PTTs have a monopoly (by consent or decree) of the public telecommunications which they have no intention of relinquishing. The general reaction to the idea of allowing VAN Services to be run by anyone but themselves is therefore anathema to them.

Two factors mitigate this uncompromising stand however; one, what exactly is a VAN, and two, to what extent can the PTTs agree to a common policy.

Notwithstanding this "a priori" reluctance of the PTTs, several have gone ahead implementing links (themselves, and even allowing others to do so for them) tying the US networks into the European public switched networks, which in turn can be tied into the packet switched networks now being implemented in most European countries.

In the United Kingdom TYMSHARE has leased to the Post Office the telecommunications switching equipment and facilities necessary to tie the Telenet and Tymnet services into the UK switched network. The transatlantic link is provided by Western Union International. Thus any data base linked to (or service provided by) the Telenet and Tymnet networks are accessible through this link (Table 1).

Demand is high: in the first three months of operation the access to transatlantic data bases from the UK exceeded the forecast for the entire initial 12-month period.

In the same way, the Dutch PTT has installed a Tymnet CP-2 concentrator (based on a Varian V72 mini) and the French and Belgians offer the same service (the French through ITT World Telecommunications) with the Swiss, Spanish and Germans similarly engaged in setting up equivalent services.

But the shape of things to come was hinted at with the recent experimental hook-up of Canada's Datapac packet switched network to the French Transpac service. Links of this nature are the Pandora's box for access by users to the VAN Services in North America.

UNEXPLORED FRONTIERS

The possibilities have yet to be explored by users, since the packet switched networks in Europe are only just coming into service, but once each country's packet switched network comes into operation, with links between them and the US and Canada established, how can the PTTs control the usage, by a subscriber, of the innumerable computers and data bases that will be on-line, each with its own applications and product/service offering? The answer is simple. They can't. In the same way, today, the use of the "mailbox" feature of a timesharing network can be construed as text/data message transmission by a private network and has been declared "illegal" by the UK Post Office. This hasn't stopped its (discreet) usage.

Euronet Will Tie the EEC Together

Euronet, a projected pan-European X-25 protocol network has started life as a private network linking data bases held in the

TABLE 1
TYMNET/TELENET LINK CHARGES
(UK Charges)

Data	$ 0.57 per thousand characters transmitted or received
Duration	$12.54 per hour per terminal
Subscription charge	$ 9.50 per user same per quarter
Data base charge	— depends on data base used

EEC (e.g., the German Institute of Medical Documentation and Information data base, held on a Siemens 4004; the European Space Agency Space Documentation Service Centre running on an IBM 360/50 in Frascati Italy, etc.). Nine common market countries have agreed to go live with Euronet by 1980. The packet switching nodes will be in Paris, London, Frankfurt and Rome with access centres in Amsterdam, Brussels, Copenhagen, Dublin and Luxembourg.

Euronet costs are not negligible but have the merit of being distance independent (Table 2).

The network will provide European packet switching facilities to those countries who do not plan to have extended domestic coverage. In Italy, for example, the PTT will provide its own packet switched network as an extension of Euronet. In many instances the international connection will be available before the domestic networks are ready.

Despite the experimental launch of several non-standard line and message protocols, one-by-one, all of the European PS networks have adopted X-25 as the standard interface. In reality there are a set of interface and procedure standards:

- X-3 defines the packet assembly/disassembly (PAD)
- X-28 defines the interface between the network and start/stop terminals
- X-29 defines the procedure between terminals and the PAD hardware.

PRIVATE INTERNATIONAL NETWORKS

There is no restriction, of course, on the use made of private networks within the company that owns them. There are many such networks, (e.g., Unilever, Philips, IBM, etc.) where subsidiary companies of a group are tied into each other for intra-company communications.

Special purpose networks with a clearly defined function (e.g., the SWIFT banking network) are also allowed. Basically the PTTs of Europe want to retain "account control" or the marketing interface with the public for the communications requirements, broadly defined. Neither digital networks (now going in for the main trunk connections) nor satellite communications will change this attitude. Both will come under the same control and restrictions, as the present analogue land lines communications.

SATELLITE COMMUNICATIONS — ARE THEY NECESSARY?

Many problems face the implementation of satellite communications most of which have nothing to do with the PTTs, but relate to the geography of Europe. In contrast to the (relatively) wide open spaces separating the large conurbations of the US, Europe is a densely populated, crowded environment which poses the following problems:

- In Europe, 30 or so sovereign countries share the spread of frequencies available (rather than two in North America)
- There are many existing microwave transmissions that would interfere with the earth/satellite/earth communications. Earth stations therefore have to be placed in remote locations
- The long distances that make satcoms worthwhile in the US do not occur in Western Europe. The economics of the situation are therefore very different.

At present earthbound link rates, and projected costs for satcoms, the break-even distance is 800 kilometres. In many countries this eliminates the economy factor in the decision process. Reliability has also to be taken into account at present, with the innumerable back-up ground links available on most connections offering strong advantages over satcoms. The same arguments apply to the use of satcoms for TV transmissions.

European developments in this sector are merely embryonic but several significant efforts have been made by individual PTTs to establish the groundwork for the practical implementation of networks serving this requirement. These studies have examined the type of input suitable for such systems in terms of content, frequency and variety of the data forms that can be classified as "mail" (short messages, personal and business letters, etc.).

The most complete and thorough study is that of the West German Bundesministerium fur das Post-und Fernmeldewesen, which has dimensioned the volumes of "mail" by type of source and receiver and the network speed necessary to accommodate it (Table 3).

TABLE 2
EURONET CHARGES

CIRCUIT TYPE	Annual Rental (A)		DURATION COST PER HOUR (B)		
	From 300 bps	to 48kbps	1200 bps	9600 bps	48kbps
PSN	38		2.57	N/A	N/A
Leased	570	5700	1.9	2.57	6.84

+ $2.19/thousand 64 byte segments

TABLE 3

SOURCE	%	Electronic Mail	%	RECEIVER
BUSINESSES	79	40%	48	BUSINESSES
PRIVATE INDIVIDUALS	21	39% 8% 13%	52	PRIVATE INDIVIDUALS

Total Volume: 5 billion messages/yr or 20 million per day

Source: Bundesministerium f. Post-/Fermeldewesen

62 ▶

Ordinary mail volume is 36 million letters per day currently, of which nearly 45 percent would be unsuitable for transmission on an electronic mail network. Around 15.8 million of the remainder comes from business sources, of which an estimated eight million can be economically accommodated by an electronic mail service, and would be handled best by remote copiers (33%) and remote typewriters (67%). Estimating each transmission as an average of 1.5 A4 pages (8¼ x 11¾), provides the number of stations needed in the network, counting an average traffic of 10 message per unit equal to 400,000 remote typewriters, and 200,000 remote copiers.

NETWORK IS PRACTICAL

The resultant network transmission volumes can be handled by today's technology, albeit with a substantial though not exhorbitant investment. The remote typewriter stations business sites would transmit input at 300 bps (1 page per minute) and the telecopiers (which transmit images and require 200,000 bits/page if redundancey is reduced) at 2400 bps (1 page every 1.4 minutes). The public "electronic mailbox" (also at 200,000 bits/page) would need to transmit at 64,000 bps. Each concentrator centre would be composed of a store and forward capability, communicating with other centres at 4800 bits (1 page every 33 seconds) and the process is reversed at the other end.

User costs per type of machine depend on the number of them taking part but in the above hypothesis the total investment would be of the order of $1.2 billion and a single letter cost of eight cents, already cost effective and competitive with conventional systems. There is little incentive to go ahead with such plans, however, since the PTTs will be faced with an enormous reconversion problem of staff, facilities and equipment. Electronic mail must surely, therefore, move forward slowly in stages co-habiting with traditional manual methods for a long time to come.

OVER 300 'INTELLIGENT' NODES

IN TYMNET'S PACKET NETWORK SERVICE

Take a close look at TYMNET quality, and you'll understand why it's the No. 1 packet network service. For example, our network incorporates more than 300 "intelligent" nodes in locations strategically situated throughout the U. S. These nodes are fully programmable, powerful computers dedicated to communications processing, not simply multiplexors.

With this quantity of intelligence built into TYMNET, our users in virtually all major U. S. locations can actually realize the value-added benefits of packet technology. Other packet networks, which most often are predominately multiplexor networks, can only offer these benefits in a few selected locations.

What are the benefits of TYMNET'S true packet network quality?

- Highly sophisticated error detection and correction
- Alternate routing if a direct transmission facility should go down
- Full compatibility with all standard terminals and transmission codes.
- "Turnkey" network management for the user
- Significant cost advantages

The number of intelligent nodes is only one of the key ways in which TYMNET differs qualitatively from other packet network services. There's also the confidence and security that comes from dealing with a packet network carrier with over five years of intensive operating experience. And the flexibility of a programmable interface to your computer. And coverage to over 130 U. S. cities. And international connections.

TYMNET has been specifically designed to meet the unique operating requirements of geographically dispersed low speed (1200 bps and below) terminals. Typical applications include time sharing, database access, and message switching.

If you're a computer network manager, you owe it to yourself to investigate the many operating and economic advantages of TYMNET, the packet network service acknowledged as number one. For more information on TYMNET and how it can assist with your data communications needs, contact your regional TYMNET office or write or call Tymnet, Inc., 10261 Bubb Road, Cupertino, CA 95014, (408)446-7031.

No. 1 in packet network service for a lot of good reasons

TYMNET®

Eastern Region (301) 770-5710 *Central Region (713) 780-4455* *Western Region (408) 446-7031*

Circle 38 on Reader Service Card

VAN Services in the US

User options are growing, as healthy demand spurs new entrants and offerings

ROBERT B. GAMBLE, Director — Market Planning
US Telephone and Telegraph Corporation, subsidiary of ITT
New York, NY

A series of FCC decisions in the past decade has provided the impetus for a flood of new communications services which are still gathering momentum. Carterfone and the MCI decision in 1968, authority for establishment of Packet Communications, Inc. (PCI) in 1973, and the shared use and resale decision in 1976 have all given substance to the FCC's campaign to stimulate innovation through competition in communications services.

In the area of data communications, the PCI decision in 1973 led to the creation of a new class of carriers — the Value Added Networks or VANs. In this article, the technically similar offerings of the traditional common carriers will also be treated as VAN Services.

In the voice area, the Other Common Carriers (OCC's) and AT&T have been introducing new private line and network services which increase the flexibility and utilization of transmission facilities and provide other user benefits. These new voice services will also be treated as "VAN Services". Communications-related plans of computer service vendors, the US Postal Service, and others (such as electronic mail and electronic funds transfer systems) could be considered in a still broader concept of "value added services", but are beyond the scope of this article.

The roster of VANs has grown — Telenet, Tymnet, Graphnet, MCI, SPC, and ITT. AT&T has responded with new offerings of its own — Enhanced Private Switched Communications Service (EPSCS), Transaction Network Service (TNS) and the highly publicized yet unannounced Advanced Communications System (ACS).

Users initially proceeded with caution in checking the quality and reliability of new VAN Services, but now they are boldly extending their usage. Tymnet's revenues grew 80% in 1977 to a figure in excess of $10 million, and this growth rate is reportedly being maintained in 1978. Telenet pegs its current growth rate at 8%/month. Industry studies project dramatic growth in the variety and usage of VAN Services during the next decade — reaching billion dollar proportions during the 1980's.

To provide an overview of the value added services currently operating or shortly to become available to users in the US we shall examine briefly the carriers and their offerings.

VAN CARRIERS

Tymnet, Inc is wholly owned by Tymshare, Inc., a major independent computer services vendor with 1977 revenues of $101 million. Tymnet was created as a private network in 1971 by Tymshare, Inc. to supply its needs for communications services. It has progressed by stages from a private network to a shared-user network to the present common carrier status and today has the largest revenue base of the data oriented VANs. It is reported to be operating profitably.

Telenet Communications Corporation (Telenet) was created by Bolt Beranek and Newman, Inc. (BBN) which remains its largest shareholder. BBN is the systems house which created ARPANET — the first major packet switching network — just 10 years ago. Telenet was formed early in 1973 and went public in December of 1977 with an $8.3 million public stock offering. It has extended its network and services since becoming operational in 1975 and is presently installing third generation packet switching equipment throughout its network to further increase its flexibility and capacity for handling data and message traffic.

International Telephone & Telegraph Corporation (ITT), long an international and overseas voice and record carrier, entered the US domestic market with its Hartford-to-Houston United States Transmission Systems, Inc. (USTS) high quality terrestrial microwave network in 1976. ITT Corporate Communications Services, Inc. (ITT-CCS) is introducing two voice-VAN Services this year: Switched Private Network Services (SPNS) and Corporate Communications Switching Equipment (CCSE). A second major ITT VAN project is the COM-PAK packet switched network of ITT Domestic Transmission Systems, Inc., which will start its nationwide facsimile service (FAX-PAK) in 1979.

MCI Telecommunications Corporation (MCI) was established in 1968 as a Specialized Common Carrier (SCC). The company achieved profitability in 1976 with annual revenue of $60 million. Today over 40% of MCI's revenues are in VAN Services, mainly EXECUNET voice service. MCI also provides Shared Private Line Service (SPLS) and Computer Controlled Switching Arrangement (CCSA) services.

Southern Pacific Communications Company (SPC) is a nationwide specialized common carrier wholly owned by the Southern Pacific Company. Its network ex-

perience is based on the extensive private microwave experience of its railroad parent, the Southern Pacific Company, and from SPC's acquisition of other microwave carriers (most recently Datran) since its establishment in 1970. SPC offers both voice and facsimile VAN Services. Its SPRINT (Switched Private Network) services were initiated in 1976. A further extension of this service (SPRINT V) is before the FCC. SPEEDFAX, SPC's facsimile offering, was introduced in 1977.

Graphnet Systems, Inc. (GRAPHNET) is wholly owned by Graphic Scanning Corporation, a designer and provider of specialized communications systems. The parent, Graphic Scanning, went public with a $10 million minority interest offering in April, 1977. Graphnet presently offers store and forward facsimile and terminal-to-terminal data services. It has under construction a packet switched data network which it states will be operational later this year.

American Telephone & Telegraph Company (AT&T) offers TNS (Transaction Network Service), an alternatively polled or dial access interactive data service in three states (Washington, Minnesota, Colorado) and will expand this "value added" service to additional states based on demand. Bell has recently introduced a CCSA-like offering designated Enhanced Private Switched Communications Service (EPSCS) — and announced its intentions to tariff a packet switched data service later this year under the designation of Advanced Communications System (ACS).

Western Union Telegraph Company (WU) is the US's major provider of record services (Telex/TWX/telegram). WU initiated MAILGRAM service jointly with the US Postal Service in 1970. Enhancements of this VAN-like service include Stored Mailgram and Business Reply Mailgram. WU's InfoCom service introduced in the early 1970's is a private message network system with store and forward and shared private line features. Western Union also provides VAN-like services for the US Government with Autodin II, which is a packet switched data network.

VAN SERVICES

Three categories of VAN Services will be discussed: Terminal-to-computer services, facsimile and other message services, and voice/data VAN Services.

Terminal-to-Computer Services

The packet offerings of Telenet and Tymnet are the only public VAN Services of this type available nationally today. AT&T's Transaction Network Services (TNS) also fits this category, but is only available on an intra-state basis in three states presently and is being rolled out slowly. AT&T, ITT and Graphnet each have terminal-to-computer networks employing packet switching technology in various stages of development.

Essentially these networks meet user needs for:

- Higher reliability — through redundant circuitry, alternate routing and sophisticated error correction techniques
- Compatibility — for interfacing a wide variety of terminals and host computers
- Economy — frequently by an order of magnitude, by efficient utilization of transmission media and distance-insensitive pricing and
- Flexibility — in choice of terminals, in adding new locations and applications, and handling growth in traffic.

Economical business applications for packet communications include:

- Remote computing services
- Data base access and information services
- Order entry and inventory management services
- Credit checking and other financial transactions
- Travel reservations and
- Electronic mail services.

The principal tradeoffs among present VAN and telco data services relate to access costs/cities directly served and data speeds and protocols which can be accommodated. An example of pricing trade-offs between packet services and long distance telephone rates is provided in Fig. 1.

On a purely variable cost basis, packet switching is cost-effective versus DDD daytime rates for any distance, and costs about one-sixth of station-to-station long distance at a distance of 1000 miles.

Facsimile and Other Message Services

In the decade prior to the emergence of VANs, Western Union was virtually the sole provider of message services in the US under monopoly protection of the US government. New technology and government policy are gradually opening the $600 million message market to competition with new facsimile systems paving the way. There are now three publicly announced carrier facsimile services, each quite different in structure and market served. They are described below in the order of appearance in the marketplace.

Graphnet began offering fax services in January, 1975. It offers both terminal-to-fax service and terminal-to-bureau service with local messenger or telephone delivery and optional mail confirmation. The latter services are marketed under the FAXGRAM trademark. The network provides compatibility of TELEX/TWX and various data terminals as input devices with facsimile output. It supports several 4-5 minute fax models as delivery terminals. Graphnet offers two or three delivery priorities depending on the service used. FAXGRAM services compete most directly with Western Union Telegram services and offer savings of up to 50% depending on the city pairs involved.

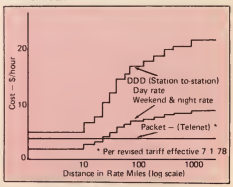


Fig. 1 DDD/Packet Rate Comparison.

52 ▶

TABLE 1

SUMMARY OF ONTYME FUNCTIONS

- Verifies authorized use at log in.
- Allows user inquiry of message status.
- Provides optional on-line message preparation and editing.
- Adds time and data to all messages.
- Assigns unique master message number.
- Holds or dials out for delivery at user's option.
- Assigns output sequence number at time of delivery.
- Delivers to group coded destinations.
- Responds with error messages to users as appropriate.
- Provides on-line file storage for frequently used messages or data.
- Holds all messages three days for on-line retrieval.
- Saves archive messages on tape for 90 days.
- Provides traffic analysis data for management control.

A real time SPEEDFAX service was introduced by SPC in 1977 as either a transmission service only or as a transmission and terminal package. Local dial-up access is provided in 24 cities (as of April 1) with six more cities scheduled by year-end. SPEEDFAX transmission rates are currently 25¢ a minute for any distance. Terminal compatibility is limited to that inherent in the fax machines employed. A store and forward SPEEDFAX service is also provided, which offers some machine-to-machine compatibility and five delivery options: 1/2 hour, 2 hours, overnight, mail out, and hold for pickup.

ITT's FAX-PAK facsimile offering becomes operational next year and provides universal compatibility among 2, 4, 6 minute and subminute fax machines including the newer Japanese models. Compatibility is also provided with TELEX/TWX and various data terminals used as input devices. A high degree of economy and reliability are provided by packet switching, data compression, and routing redundancy in this national network. Three delivery options are offered: immediate (within 15 minutes), four hours, and overnight. Other features offered are multiple addressing, acknowledgement of receipt, and directory services. Price is dependent upon use not distance. This lowered cost will make a variety of new electronic mail applications feasible for large and small business users.

MAILGRAM was created in 1970 as a joint service of Western Union and the US Postal Service. It provides the user substantial economies versus Telegram service while retaining much of the attention-getting qualities of a Telegram. A full range of input options are available for MAILGRAM, including TELEX/TWX, phone-in, and hand-carry to the nearest WU office. Messages are carried via WU circuits to any of 140 serving US Post Offices for next day delivery via the Postal Service. Business reply, stored address list, and stored text options provide the user with additional flexibility. MAILGRAM is now a $50 million business for Western Union and growing in excess of 20% per year. It appears that 1978 will be the cross-over-year — in which MAILGRAM revenues surpass those of Western Union Telegram services for the first time.

Perhaps the most significant group of new public message services ultimately will be the new computer-based message systems. Three such offerings have been approved by the FCC; Tymnet's OnTyme service is tariffed and presently becoming available. ITT's terminal-to-terminal service and Telenet's TELEMAIL service are not yet available. These services will offer many computer-based flexibilities. Features of OnTyme as outlined in Table 1 are representative. Present service rates for OnTyme message service include:

The monthly service charge is $1.00 and usage charges (distance

TABLE 2

COMPARISON OF SWITCHED PRIVATE LINE OFFERINGS

Service Description	MCI	SPC[1]	ITT
1. Measured usage point-to-point voice or data (a hotline-like service)	Quickline	SPRINT I	SPNS
2. Foreign exchange service (FX)	SPLS	SPRINT II	SPNS
3. Measured usage, switched service	SPLS	SPRINT III	SPNS[2]
• Dedicated access line one end			
• Service between designed city pairs			
• On-net to off-net capability			
4. Measured usage, switched service with off-net-to-off-net capability	EXECUNET (will take new customers up to capacity of present facilities. Further legal and regulatory actions pending.	SPRINT V (Tariff not yet approved by FCC)	
Tariff Rates			
5. Access Line	$45	$32	$30
6. Port charges	$50	$65	—
7. Usage charges per minute (plus $.0016/100 miles in all cases)	$.1200	$.1125	$.1563
8. Minimum monthly usage charge	$250/originating end	—	$150/port

Notes
1. SPRINT IV not approved by FCC. Offering withdrawn and replaced by SPRINT V
2. SPNS similar to the others except no off-net calling provided

54 ▶

Data communications made simple. The DECwriters.

Simplicity is part of what makes the DECwriters the world's most popular 30 CPS teleprinters.

And we took the same simple approach to our communication options:

Our unique modem/DAA includes a phone plug which lets you connect the terminal to any modular phone jack. And since both modem and DAA are tucked neatly inside the terminal, there's nothing extra to lug along.

Our integral acoustic coupler uses a single electrical connection — no EIA interface needed. Everything is in one compact package, and it fits right on the back of the terminal.

Our electronic send/receive buffer (ESR) is a neat, convenient alternative to magnetic and paper tape. It's simple to use, which saves operator time. And its quick editing capability minimizes phone line charges. In fact, the ESR will normally pay for itself within four months.

Naturally, the options you need depend on the applications you have in mind. But one thing's for sure — you won't find any simpler solutions than ours.

For details, call 800-225-9220 (in Mass., 617-481-7400), or write Digital Equipment Corporation, MR2-2 M70, Marlborough, MA 01752.

digital
COMPONENTS GROUP

Circle 29 on Reader Service Card

insensitive) are 4¢ a minute for 110-300 baud access at high density locations and 25¢ a minute via in-WATS.

A typical 500 character message entered via a 300 bps terminal in a high-density city and delivered at 300 bps in a low-density city would have a message cost of 32¢.

Voice/Data VAN Services

The two major classes of voice/data VAN Services are shared private line services and common control switching arrangements.

The former, represented by MCI's EXECUNET, SPLS and Quickline services, SPC's SPRINT services and ITT's SPNS service provide means for the small-to medium-sized user with multiple interstate locations to benefit from the economies of shared private line usage. These offerings thus fill a significant gap between telco DDD, WATS and private line offerings. VAN rates for a daytime New York to Los Angeles call are roughly half the cost of a station-to-station DDD call. Table 2 distinguishes the offerings of the three carriers. These VAN Services may be used alternatively for voice or data (Tables 3, 4).

Common Control Switching Arrangement service (CCSA) was first offered by AT&T in the 1960's in response to demand of very large users for uniform numbering, automatic alternate routing, and other features. MCI introduced its CCSA offerings in September of 1976, directed at a broader range of users having a mixture of leased, FX and WATS lines as well as DDD — applications where trunk status reporting and least-cost routing can measurably improve service and substantially reduce cost. Early this year, AT&T cut over its first customer on a new service — Enhanced Private Switched Communications Service (EPSCS). EPSCS offers all ESS, 4-wire switching features and customer network control center on customer premises. The new service requires a customer to order and maintain a minimum of 700 terminals (ports) and 125 terminals at each switch.

In June, 1977, ITT was the first to tariff a modernized CCSA service — its Corporate Communications Switching Equipment service (CCSE). The ITT offering is highly competitive for companies that do not meet the minimum port requirements of EPSCS. Relative competitiveness for the largest systems will depend on location of specific user facilities relative to network switches. Switching features of CCSE (features common also to SPNS) are comparable to EPSCS with some pluses and minuses on both sides.

ITT's CCSE and SPNS have some common features: 4-wire switching; uniform 7-digit numbering plan; abbreviated dialing; alternate routing; adaptive routing; hot line; conference calling; customer management center; and call record logging. CCSE and EPSCS each began life with seven switching cities — four in common: New York, Chicago, Los Angeles, and Dallas. CCSE adds Atlanta, Memphis, and Cleveland. EPSCS adds Rochester, White Plains, New York, and Arlington, Virginia.

TABLE 3

SERVICE	CARRIER	YEAR SERVICE INITIATED	CITIES SERVED MID-1978	SERVICE OFFERED INT'L
Data Services				
A. Packet Switched and other Interactive Data Services				
TYMNET	TYMNET	1972	135	X
TELENET	TELENET	1975	81	X
COM-PAK	ITT-DTS	Future	–	–
GRAPHNET	GRAPHNET	Future	–	–
ACS	AT&T	Future	–	–
TNS	AT&T	1977	3 states	–
B. Facsimile and other Message Services				
GRAPHNET	GRAPHNET	1975	46	X
SPEEDFAX	SPC	1977	24	–
FAX-PAK	ITT-DTS	1979	–	–
MAILGRAM	Western Union	1970	140 *	–
FAXGRAM	GRAPHNET	1975	–	–
ON-TYME	TYMNET	1977	–	–
TELEMAIL	TELENET	Future	–	–
COM-PAK	ITT-DTS	Future	–	–

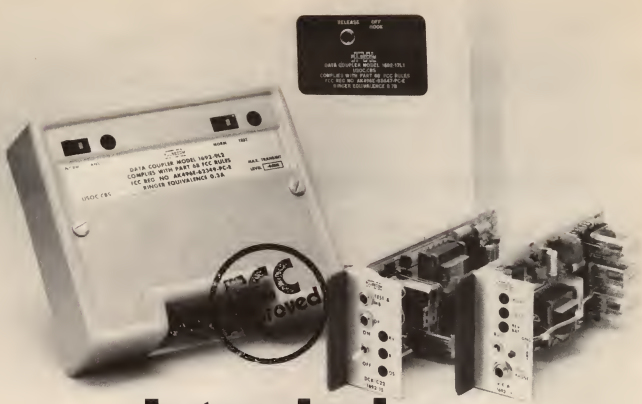
* Accesses all cities in USA from 140 serving postal stations

TABLE 4

SERVICE	CARRIER	YEAR SERVICE INITIATED	CITIES SERVED MID-1978	SERVICE OFFERED INT'L
Voice/Data/Services				
A. Switched Private Line Services				
QUICKLINE	MCI	1974	18	–
EXECUNET	MCI	1975	18	–
SPLS	MCI	1975	18	–
SPRINT I, II, II	SPC	1976	20	–
SPRINT V	SPC	–	–	–
SPNS	ITT-CCS	1978	16	–
B. CCSA Services				
CCSE	ITT-CCS	1978	7 **	–
CCSA	MCI	1976	6 **	–
EPSCS	AT&T	1978	7 **	–

** Switch locations

62 ▶



Introducing a sensible alternative in voice and data couplers.

Pulsecom voice and programmable data couplers. Registered and approved by the FCC. High quality. High density packaging for tangible space savings. Low prices. Feature packed.

Pulsecom coupler techniques promise easy solutions to meet your ever-changing data and voice communications requirements. Moreover, only Pulsecom programmable data couplers give you automatic and separate transmit and receive level control. Pulsecom voice couplers deliver the same performance standards. DC isolation, surge and spurious voltage protection. Lower power consumption. Space-saving packaging.

All in all, Pulsecom offers you a sensible alternative to meet your voice and data coupler requirements. An alternative to other sources of supply (or lack thereof). An alternative which will allow you to earn more revenue, or save on operating costs, or both. An alternative which affords more features than virtually any other couplers on the market. And delivery from stock.

It's time you took advantage of the sensible alternative. Pulsecom. Write or call today for more information. Pulsecom Division, Harvey Hubbell, Inc., 5714 Columbia Pike, Falls Church, Virginia 22041; 703/998-4300. Telex 89-9423.

HUBBELL

Pulsecom

The Sensible Alternative

Circle 31 on Reader Service Card

The Future of Value Added Network Services

PETER A. CUNNINGHAM *President*
ELY S. LURIN *Principal — INPUT*

In this article, VAN Services are defined as regulated services which do more than merely transmit information. This definition is chosen because it is the intent of the article to examine the total range of services needed by communications users. Thus, legal issues as who actually owns the communications lines are not examined or included here.

VAN Services are in extensive use, considering the relatively short time they have been in existence. For example, packet switching (supplied by a VAN) is used by over 15 percent of the Fortune *100/10 companies in the US. In 1977, according to the study "Value Added Network Services" by INPUT, the VAN market for Data/Text/Image VAN Services was $50 million, growing at 40 percent per year.

This acceptance and growth is particularly significant in that:

- AT&T is not participating (in a substantive sense) in the market.
- The majority of participating vendors in the VAN market (to date) are relatively small companies.

Even without the participation of AT&T or other large vendors, a strong market for Data/Text VAN Services has developed, demonstrating that a basic need exists.

VAN SPECTRUM

In examining the range of possible VAN Services, it is important to note that communications and computing are so entwined that it is often impossible to separate them. The increase in the amount of office automation equipment which is tied to the communications network complicates the problem of defining where communications ends and computing or text processing starts.

To illustrate the relationship between computation and communications, a spectrum of services that extends from pure communications to pure computation is presented in Figure 1. The extremes of the spectrum are either pure communications services or pure computation services, while the remainder consists of combined computation and communications services. The regulated "combination" services are VAN Services, while the unregulated services are called hybrid services. However, the VAN-to-hybrid distinction is artificial and does not reflect the user needs.

There is a wide range of possible VAN Services, and (just as in computing) many specific offerings are possible in this range including the following services:

**Data/Text Services

- Packet switching and fast circuit switching are complementary services. Both fill a different need for the same user. Packet switching requires little effort to use and is highly reliable. However, transmission speed is relatively limited and the service is presently not suitable for voice transmission. Some compatibility functions can be provided. Fast circuit switching does not require any computation overhead (once the circuit is set up), permits higher speed data transmission, and is suitable for voice. However, it does not provide any error checking or compatibility functions.
- Store and forward and polling services help the user organize data flow. Both are suitable for messages as well as Data/Text.
- Compatibility services include services which simply make facsimile, data terminals, or text-editing equipment "look

*Fortune 100/10 Companies — The top 100 manufacturing companies listed by Fortune Magazine and the top 10 of each of the other Fortune industry sectors.

**Text — Information consisting mostly of words intended to be read by a person. The quality of the document will be high. Data — Information consisting mostly of numbers intended for either a machine or a person.

40 ▶

The Un-Tie Line.

SPNS—a new voice communications network that can replace busy tie lines without the maze and expense of multiple lines. This network may reduce the number of costly interoffice WATS and long-distance calls. SPNS, the Switched Private Network Service of ITT Corporate Communication Services, adds efficiency and economy to your interstate office-to-office voice and data communications.

With SPNS your telephone is connected to our switching centers. You place your calls and we get them through. You benefit from our interstate telephone network at lower costs because you only pay for what you actually use.

SPNS was developed by ITT and is backed by 100 years of telecommunications experience. Why not learn more by mailing the coupon. Or call (212) 558-9600.

T-78

Sales Department
ITT Corporate Communication Services, Inc.
1 Whitehall Street
New York, N.Y. 10004

Please send me more information about SPNS.

Name_____

Title_____

Company_____

Address_____ City_____

State_____ Zip_____ Phone_____

My company has offices in_____

Talk to us.

ITT CORPORATE COMMUNICATION SERVICES, INC. ITT

Circle 21 on Reader Service Card

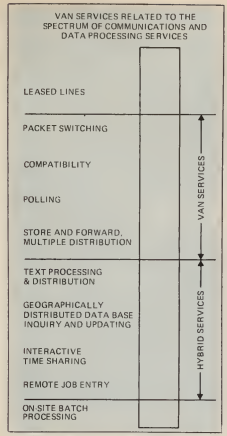


Fig. 1 Communications and Computation Services.

alike" by providing speed, code, and format conversion facilities. More complicated hybrid applications involve changing the structure of the data and implementing sophisticated protocols. A recent survey of over 160 very large communications users showed that compatibility services are the most desired of all VAN Services. Communications users look upon compatibility services as a way to allow them to use any type of terminal device in their systems. Since the average Fortune 500 user has over 800 terminal devices (including facsimile) in its network, this flexibility is an important advantage.

SERVICES

†Message services will range from the present services of TWX, TELEX, and MAILGRAM now offered by Western Union to more complex services which offer the ability to transmit and reproduce large volumes of text and graphic information. These will be developed during the next five to ten years.

Voice will continue to account for the bulk of communications expenditures during the next 10 years. Voice administration and control is a much desired VAN Service because of its potential to reduce communications costs through optimum routing of telephone calls among the direct dial, WATS, and private line services of a company. The ability to bill back communications charges to individual departments is also a desired feature.

Image services, which are just beginning to be offered, include facsimile compatibility and image store and forward. The future availability of low cost, wideband communications facilities will trigger the viability of video conferencing.

Support services are used to help users design communications systems and keep them operating. These services include maintenance-related support services such as repair, fault location, automatic diagnosis of the faults, network design, and training of operations personnel. They are much in demand by users.

Electronic Mail

Electronic mail will quickly become important because of the rapid growth of office automation. Over 50 percent of the Fortune 500/50 companies expect that they will have office automation equipment connected to the communications network by 1982. This will be the driving force for electronic mail. It is important to note that there is no one service called "electronic mail". Existing and potential VAN Services will be used in this area including the data, compatibility, and image services discussed above.

The percentage of documents which contain graphics as well as image information is very high and the ability to combine text and image information in an efficient manner will be one of the keys to a broad-based electronic mail service.

All participants in the information services field will be affected by VAN Services. Communications companies will be affected by VAN Services because AT&T will have more opportunities to service subscribers and increase the size of each account by performing additional services for the user in the network. AT&T will also find its basic communications services market will increase as it provides backbone communications to VAN Services vendors. But it will also encounter stiff competition from Satellite Business Systems and some of the more specialized carriers.

The independent carriers will be able to offer AT&T-designed VAN Services as an extension to AT&T. However, there will be direct competition to AT&T services from specialized VAN and hybrid vendors. The independents will, therefore, have to decide whether they should enter the VAN market on a nationwide basis to meet this specialized competition.

The VAN and specialized common carriers have the option of providing unique and specialized services to areas of the market which are too narrow for AT&T.

Computer services companies will find that there are many new opportunities in the VAN area. Many computer services firms will participate in the market. Industry specialization can extend to the communication of the data as well as to its processing. EFTS is an example of a specialized inter-company communications opportunity.

Computer and office equipment manufacturers can expect to see a rapid increase in user needs for equipment which operates in conjunction with VAN Services, especially in the electronic mail area. They will also find that new user needs (such as privacy and keeping files of communications) will develop and that these needs can be met by intelligence being built into the communications network, as well as by on-premises equipment. Thus, a new form of competition will emerge.

†Message — A communication mostly in words intended to be read by a person. The quality of the received document does not have to be high.

42 ▶

Users of communications services will find themselves in a situation similar to that of the EDP department. That is, the communications system will be comprised of different services supplied by different vendors. These services will have to be made compatible to the needs of the user organization. The users will, therefore, be in a much more sophisticated communications environment. The new communications services will provide greater benefits to the user corporation. However, the risk of making expensive mistakes will also increase.

THE FUTURE

- The use of communications will continue its rapid growth and the Value Added Network Services will have a substantial share in this growth.
- Basic developments in the communications field are shown in Figure 2.
- Present trends toward distributed processing, remote computing, and office automation will continue and drive the market for VAN Services.
- The US Postal Service will not improve its service and this will drive companies to electronic communications.
- Satellite Business Systems (SBS) will be successful in persuading top management of major companies that the use of communications will increase the productivity of their firms. The attention of top management of all firms will then be focused on communications, thus, rapidly increasing the market potential.
- The VAN vendor firms, especially the fast acting computer services companies, will establish new, acceptable services.
- AT&T, in reaction to SBS, will offer comparable terrestrial or satellite wideband services.

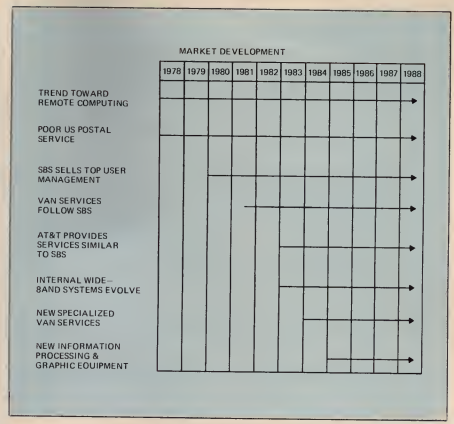


Fig. 2 Projected Market Developments in Communications.

Information to the End User

With both AT&T and SBS providing wideband external communications to establishment premises, wideband internal communications systems will develop. These systems will distribute information throughout the establishment and allow information to directly reach the end user. In addition, the large amount of bandwidth (both external and internal) will make video conferencing and high speed facsimile practical.

The large amount of information processing, display, and communications equipment located on user premises will encourage an increased use of VAN Services. These services will fill unique niches within either industry or application specialties.

Extensive communications networks will, in turn, encourage the development of new information processing, storage, and distribution equipment for use in handling data, text, and, especially, graphics information.

Additional external events will positively affect the VAN Services market in the long term. Increasing energy costs will result in the use of information processing to minimize the expense of shipping goods, materials, and personnel.

The AT&T/IBM/XEROX confrontation in the office environment will be in the area of equipment interconnected to communications. Such equipment will process text, data, and images, as well as the storage and retrieval of this information. This confrontation of major vendors will increase the rate of introduction of equipment into the office.

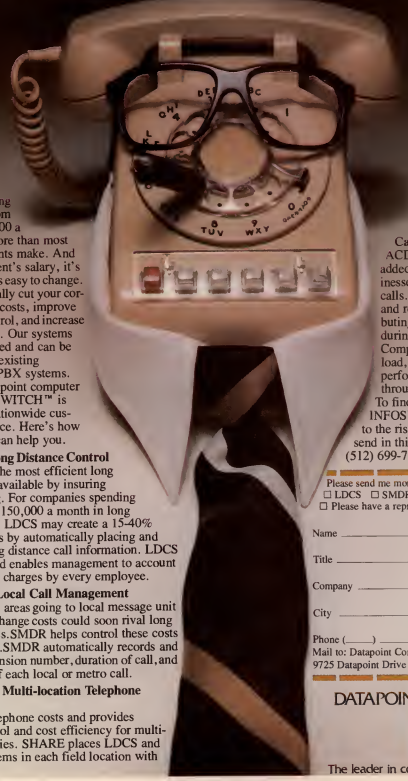
The introduction of information/automation into the home and into extremely small enterprises will demonstrate that, with microprocessors decreasing in cost, it will be far easier to produce and deliver information processing equipment than to use it. VAN Services vendors can provide the installation of applications for this equipment and interfaces for such services as in-home marketing and news distribution.

The US is rapidly becoming an ††information economy. Thus, all the events in a long range scenario point toward more communications and the need for more VAN Services.

†† Information — An encompassing term including text, data, and graphic images.

COME FACE TO FACE WITH ONE OF AMERICA'S HIGHEST PAID EMPLOYEES.

DATAPOINT'S FOUR INFOSWITCH SYSTEMS HELP YOU CONTROL YOUR COMMUNICATIONS BUDGET.



You may be paying this employee from $5,000 to $150,000 a month. That's more than most company presidents make. And unlike the president's salary, it's one expense that's easy to change. We can dramatically cut your corporate telephone costs, improve management control, and increase user convenience. Our systems are computer based and can be configured to fit existing CENTREX and PBX systems. And like all Datapoint computer products, INFOSWITCH™ is backed by our nationwide customer service force. Here's how INFOSWITCH can help you.

LDCS — For Long Distance Control
LDCS provides the most efficient long distance service available by insuring least-cost routing. For companies spending from $5,000 to $150,000 a month in long distance charges, LDCS may create a 15-40% reduction in costs by automatically placing and recording all long distance call information. LDCS simplifies use and enables management to account for long distance charges by every employee.

SMDR — For Local Call Management
With more metro areas going to local message unit billing, local exchange costs could soon rival long distance expenses. SMDR helps control these costs and gauge usage. SMDR automatically records and stores caller extension number, duration of call, and number dialed of each local or metro call.

SHARE — For Multi-location Telephone Management
SHARE cuts telephone costs and provides centralized control and cost efficiency for multi-location companies. SHARE places LDCS and SMDR sub-systems in each field location with the main computer at the central office.

ACD — Automatic Call Distributor
ACD is a sales saver and an added customer service for businesses that depend on in-coming calls. ACD automatically manages and routes in-coming calls, distributing them to agent terminals during normal and peak periods. Complete information such as call load, waiting time, and agent performance is instantly available through video consoles.

To find out more about how INFOSWITCH can help you face up to the rising costs of communications, send in this coupon, or call (512) 699-7280, in San Antonio, Texas.

Please send me more information about INFOSWITCH
☐ LDCS ☐ SMDR ☐ SHARE ☐ ACD
☐ Please have a representative call. **infoswitch**

Name _____

Title _____

Company _____

City _____ State _____

Phone (____) _____ Zip _____

Mail to: Datapoint Corporation
9725 Datapoint Drive San Antonio, Texas 78284 TC-7

DATAPOINT CORPORATION

The leader in communications management™